

# Hydrotreated Biodiesel (HVO): Sustainable Fuel Production and Corrosion Inhibition of Mild Steel



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**Hypothesis:** Through development of a new production process of hydro-treated biodiesel, a better and more sustainable fuel than normal biodiesel can be created. This can then be applied to Corrosion inhibition of gas pipelines building off past research on biodiesel as a corrosion inhibitor

## Background:

- Billions of dollars are lost every year from the irreversible damage in gas pipelines by corrosion [1]
- Bio-Fuels can reduce green house emissions by
- Up to 86% [3]
- Green inhibitors are those that are naturally derived, biodegradable, and environmentally safe compounds [2]

## Methods:

- Biodiesel is first made by reacting Vegetable with ethanol using KOH as a catalyst
- AlMo/Al<sub>2</sub>O<sub>3</sub> is made for use as a catalyst in Hydrocracking process
- Bio-Diesel is added into HTL reactor shell with two weight percent Catalyst and then sealed and reacted with High pressure of Hydrogen gas
- Bio-Diesel and HVO is characterized with Bomb Calorimeter

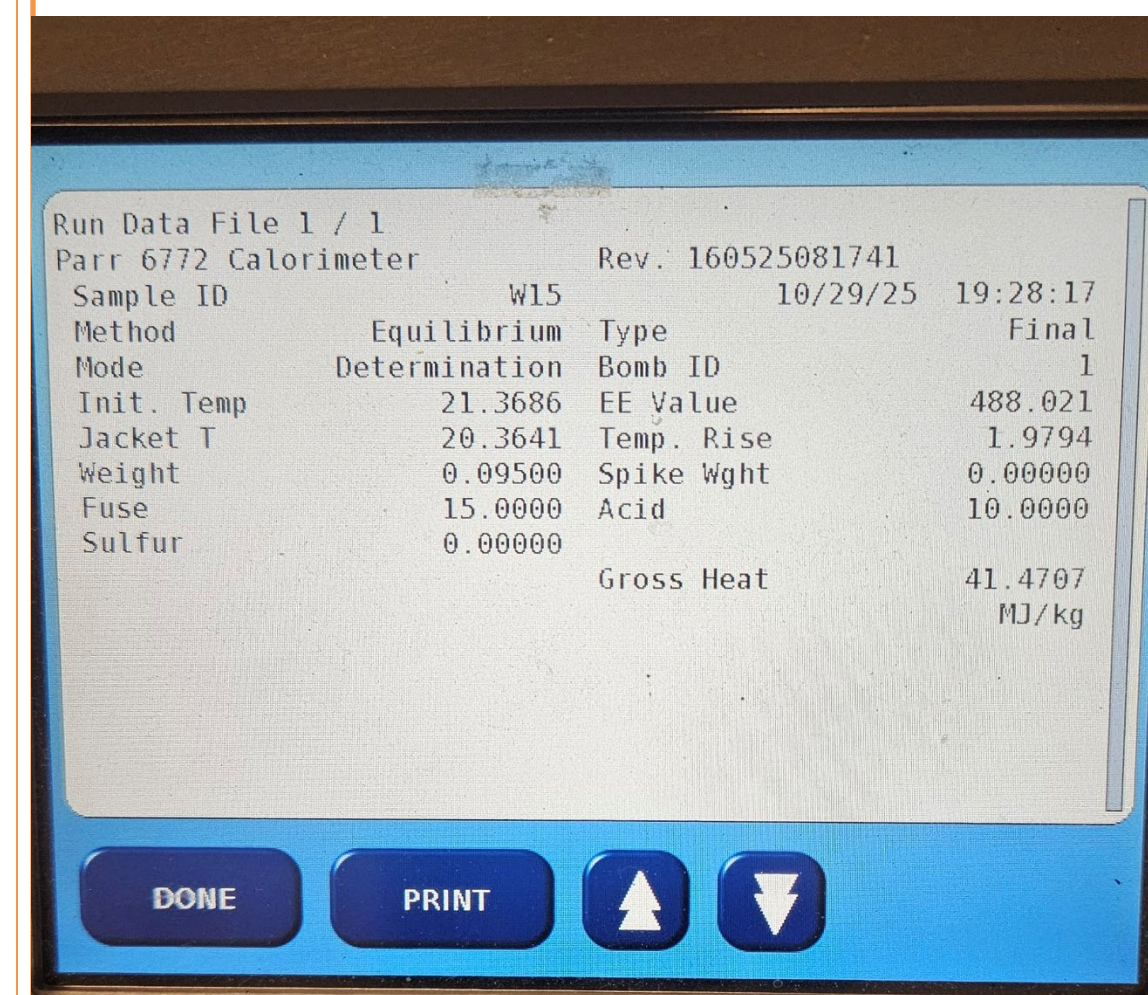
## Results:

### Bomb Calorimeter:

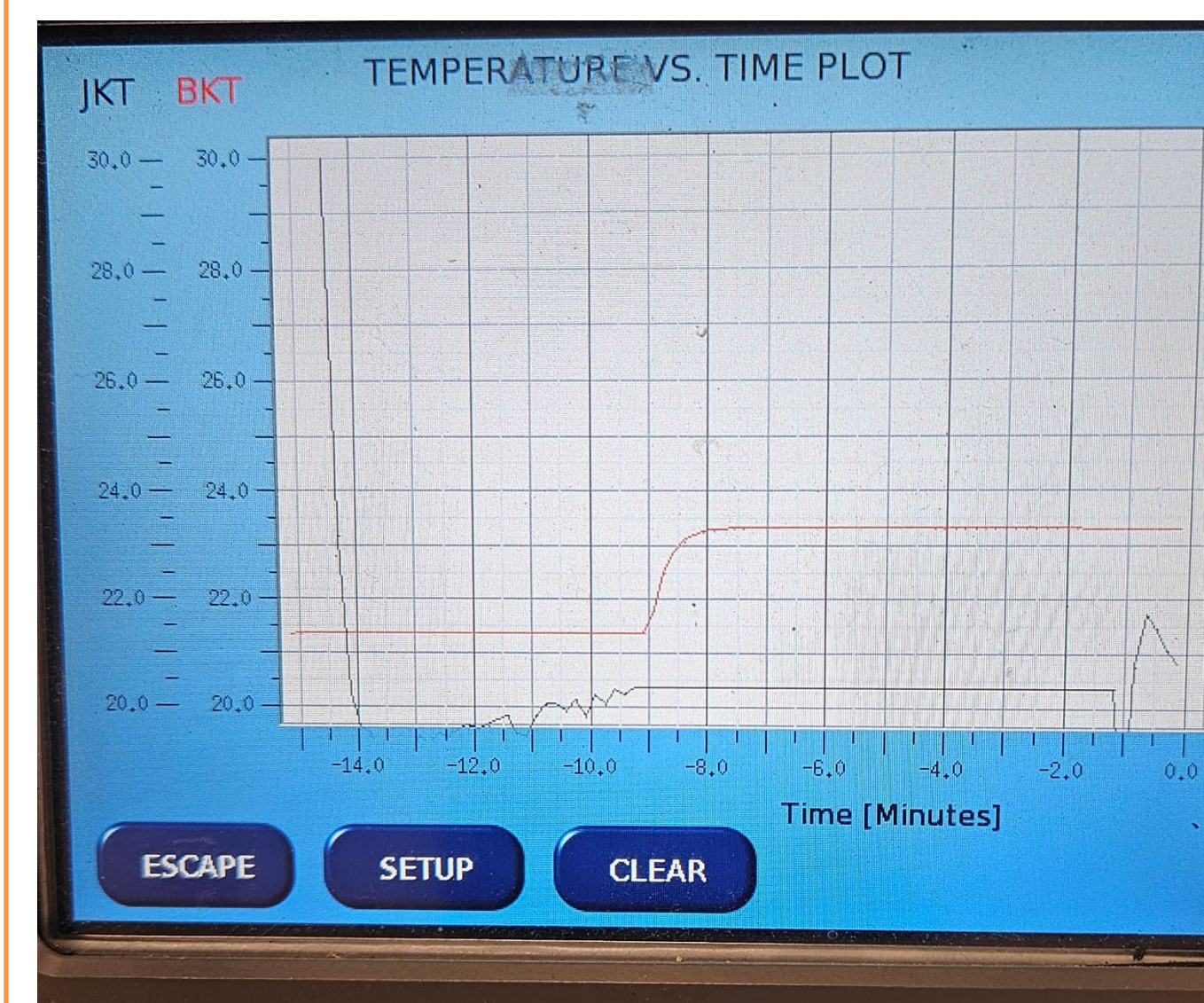
Bio-Diesel

vs

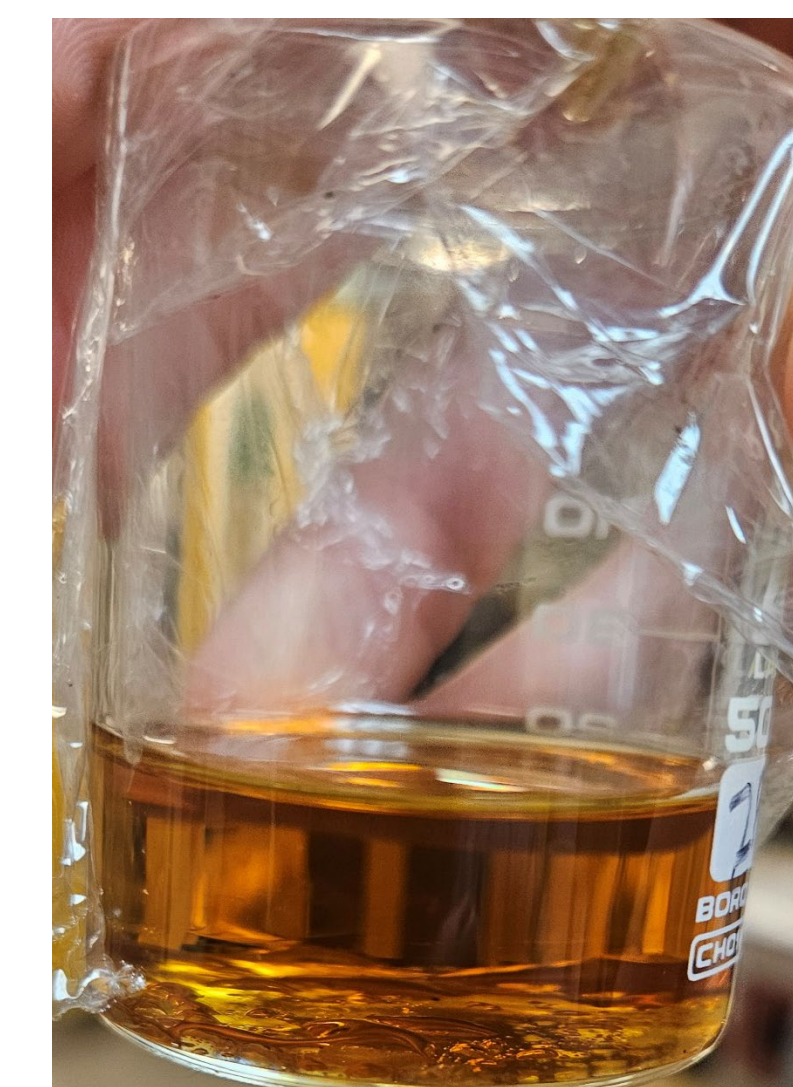
HVO



## Graphical Values:



## HVO:



## Conclusion:

- Hydro-treated biodiesel shows a significantly higher heating value than lab produced biodiesel
- Through tabulator data HVO produced falls in range for heating value and density of industry HVO
- HVO sees potential as a replacement for diesel and future work will be used to characterize products and alter process for better fuels

## References:

- [1] Koch, G. (2017). Cost of corrosion. *Trends in oil and gas corrosion research and technologies*, 3-30.
- [2] Harsimran, S., Santosh, K., & Rakesh, K. (2021). Overview of corrosion and its control: A critical review. *Proc. Eng. Sci.*, 3(1), 13-24.
- [3] *Office of Energy Efficiency and Renewable Energy*. (n.d.). Energy.Gov. Retrieved November 3, 2025, from <https://www.energy.gov/eere/office-energy-efficiency-and-renewable-energy>
- {4} Shie, J.-L., Yang, W.-S., Liao, Y.-R., Liao, T.-H., & Yang, H.-R. (2021). Subcritical Hydrothermal Co-Liquefaction of Process Rejects at a Wastepaper-Based Paper Mill with Waste Soybean Oil. *Energies*, 14(9), 2442. <https://doi.org/10.3390/en14092442>

[4]

